In re Application of GEIDL
Serial No. 09/993,331

REMARKS

The Office action has been carefully considered. The Office action rejected claims 1-32 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,741,994 to Kang et al. ("Kang"). Applicants respectfully disagree.

By present amendment, claims 1 and 15 have been amended for clarification and not in view of the prior art. Applicants submit that the claims as filed were patentable over the prior art of record, and that the amendments herein are for purposes of clarifying the claims and/or for expediting allowance of the claims and not for reasons related to patentability. Reconsideration is respectfully requested.

Prior to discussing reasons why applicants believe that the claims in this application are clearly allowable in view of the teachings of the cited and applied references, a brief description of the present invention is presented.

The present invention is directed, generally, to a system and method for improving the recognition accuracy on natural human input data (*e.g.*, handwritten data, speech data, and so forth) using context-biased recognition. Natural human input may be characterized as being entered directly from a human such as speech or handwriting. In direct opposition, typing into a keyboard is not a form of natural human input as typing is meaningless without a keyboard interface. Speech and handwriting do not require a computing media or computing system in and of themselves as does such textual input.

Speech is generally composed of waveforms (*e.g.*, representing phonemes), while handwriting is maintained in the form of electronic ink, which in general

corresponds to a set of X, Y coordinates input by a user, and additional state information such as an "up" or "down" state, ink thickness, pressure, writing angle and/or other state data. Notwithstanding, it will be appreciated that the present invention is applicable to virtually any type of user input that corresponds to words, characters or other symbols that can be mixed with and/or eventually converted to text.

In one exemplified embodiment, recognition accuracy for natural input data may be improved by a contextual mapping engine and by adapting to user bias data to bias recognition. Context-related information comprising rules or the like (such as specifying allowed input), and/or user bias data (such as in the form of a dictionary, word list or the like that contains character combinations biased to the user's likely intent), may be provided to the recognizer. The recognizer may use the user bias data and any rules information to interpret the natural input and return its result.

The system and method may use contextual mapping to improve recognition accuracy by biasing recognition based on the context of an input field. As natural input data is determined to be incoming and being entered into an application field, the context type of the field may be determined and used to locate context-based validation rules and context-based user bias data. The context-based validation rules and context-based user bias data is based upon the determination that user input is both natural human input and a context type of field for which the natural human input is intended. When entry of the natural input data may be complete, the context-based validation rules and context-based user bias data may be

provided to a recognition engine with the natural input data. The recognizer may then bias its recognition result by using the rules and the user bias data to recognize the natural input. In various embodiments, a field signature generator may determine each field's context, independent of the application, and a data harvesting engine may automatically collect user bias data from various data stores. To determine the field type, each input location into which an executable program such as an application program can receive input data may be mapped in an embodiment to a unique field signature. User bias data may be obtained in an embodiment from a user-specific database (user bias database) of entries for each field type that has an associated factoid created and maintained for data input into the field.

Note that the above description is for example and informational purposes only, and should not be used to interpret the claims, which are discussed below.

Turning to the claims, amended claim 1 generally recites in a computing device, a computer-implemented method for recognizing natural human input, the method comprising receiving, at a system component, natural input data directed to an input field of an executing program, wherein the natural input data comprises an input other than textual input, determining, external to the executing program, a context of the field, locating biasing information based on the determined context of the field, and providing a recognition result to the executing program, the recognition result biased by the biasing information and comprising at least one computer code corresponding to recognition of the natural input.

The Office action rejected claim 1 as being anticipated by Kang. More specifically, the Office action contends that Kang teaches receiving, at a system component, natural input data directed to a field of an executing program. Fig. 3, element 304 of Kang is referenced. The Office action also contends that Kang teaches that the natural input data comprises an input other than textual input. Column 9, lines 26-30 of Kang is referenced. Further, the Office action contends that Kang teaches determining, external to the executing program, a context of the field. Column 7, line 42 to column 8, line 67 of Kang is referenced. Further yet, the Office action contends that Kang teaches locating biasing information based on the context of the field. Column 8, line 3 to column 9, line 21 of Kang is referenced. Finally, the Office action contends that Kang teaches providing a recognition result to the executing program, the recognition result biased by the biasing information and comprising at least one computer code corresponding to recognition of the natural input. Column 6, line 36 to column 7, line 31 of Kang is referenced. Applicants respectfully disagree.

Kang is directed, generally, to an application configured to display a GUI data input screen so that a user may input data *using a keyboard to type* textual information in the data input screen (although Kang does consider that a user initially may capture data via handwriting or voice data and then convert that data into text) before further processing by an organize application. In any event, when the user completes the input data entry, the text is already established as such, and the user may activate an organize application. If there are sufficient fields of data input to define a meaningful record, the data may be displayed to the user for

confirmation. Otherwise, the system may prompt the user that there is insufficient data to define any meaningful record. A record is considered meaningful in Kang if it contains a minimal set of fields. For example, the application requires that an entry to the contact data store must contain at least a name and a telephone field or at least a name and an address field. If there is at least one single recognizable and meaningful record, the sequence will proceed to a display a confirmation screen.

Significantly, Kang's program only works with text, whether input as such or pre-recognized in a conventional manner. Kang is silent as to how the handwriting or speech (natural input data) is recognized in the first place. Thus, Kang certainly does not disclose the particular manner of recognition recited herein, e.g., by using context-related information or user bias data for purposes of recognizing natural input data (e.g., handwriting or speech) as text. Rather, Kang accepts input data, converts to text if necessary, and only thereafter uses an organization application to identify a data type for each line of data and then the record type of any identified records for storing the input data in the database records. This is an unrelated approach to that claimed; using data analysis on text to identify a record type for a database record is of no use in recognizing natural input data into text.

Indeed, the inventions even operate at different conceptual times; the present invention operates before and in conjunction with natural input data recognition, whereas Kang's program operates well after any recognition that may be needed has already been completed. The recognition referred to in Kang is not

natural input data recognition, but rather text processing to recognize text patterns and the like.

Notwithstanding, the Office action cited column 7, line 42 to column 8, line 67 as teaching determining a context of a field. This is not correct. This disclosure in Kang teaches identifying a data type by analyzing the text itself. For example, if a string of characters is entered, it is determined that the input is a character input, and if a series of number longer than six characters is entered, it is determined that the input is a phone number. The location (e.g., type of field) in which the input is entered is irrelevant in the Kang disclosure, as only the text pattern itself matters in Kang. Such data analysis based on the data itself is not the same as determining the context of the input field as recited in claim 1. As such, Kang also cannot be construed to teach locating recognition biasing information based on the determined context of the input field, in that Kang does not and cannot determine any input field's context.

Moreover, in contrast to the plain language of claim 1, King's "fields" are not input fields where natural input is directed, but rather fields of a database record in which already existing text is to be stored. Claim 1 and a number of the dependent claims have been amended to emphasize that the natural input is directed toward an input field, and not, for example, a database record's field to which text is output. Simply put, Kang does not determine the context of an *input* field. As such, applicants submit that claim 1 is allowable over the prior art of record for at least the foregoing reasons.

Applicants respectfully submit that dependent claims 2-14, by similar analysis, are allowable. Each of these claims depends either directly or indirectly from claim 1 and consequently includes the recitations of independent claim 1. As discussed above, Kang fails to disclose the recitations of claim 1 and therefore these claims are also allowable over the prior art of record. In addition to the recitations of claim 1 noted above, each of these dependent claims includes additional patentable elements.

For example, claims 2 additionally recites wherein the biasing information comprises a factoid including at least one validation rule and claim 4 additionally recites wherein providing a recognition result to the executing program includes providing the factoid to a recognition engine. As other examples, claims 5-7 additionally recite wherein the biasing information comprises a set of user bias data (claim 5), maintaining the set of user bias data in a user bias database, and retrieving the set of user bias data from the database by querying the database with a key that corresponds to the field (claim 6), and harvesting the user bias data from at least one data store accessible to the computing device (claim 7). For at least the foregoing reasons, applicants submit that Kang fails to teach the recitations of claims 2-14.

Turning to the next independent claim, amended claim 15 essentially recites a human input recognition engine configured to convert natural input data to recognition results, including by using biasing information corresponding to a type of an input field. The Office action rejected claim 15 as being anticipated by Kang. More specifically, the Office action contends that Kang teaches a recognition

engine configured to convert natural input data to recognition results, each recognition result comprising at least one computer code. Fig. 3, Fig. 4, and Fig. 5 of Kang are referenced. Further, the Office action contends that Kang teaches a field determination mechanism that determines field types in fields of executable programs. Column 7, line 42 to column 8, line 67 of Kang is referenced. Further yet, the Office action contends that Kang teaches at least one database that maintains biasing information for a plurality of field types. Column 8, line 45 to column 9, line 21 of Kang is referenced. Still further, the Office action contends that Kang teaches an input system configured to:1) receive natural input data directed to the field; 2) communicate with the field determination mechanism to obtain the field type of the field to which the natural input data is directed; 3) obtain biasing information from the database that corresponds to the field type; 4) communicate the natural input data and the biasing information to the recognition engine and receive the recognition result therefrom; and 5) provide to the executing program at least one computer code corresponding to the recognition result received from the recognition engine. Fig. 3, Fig. 4, Fig. 5, column 8, line 45 to column 9, line 21 of Kang are referenced. Applicants respectfully disagree.

As discussed above, Kang is directed to a system and method for allowing a user to save text data in a database, in which the text is first organized based on text analysis. Nowhere does Kang describe a field determination mechanism that determines field types in input fields of executable programs. Nowhere in Kang may there be found any teaching regarding obtaining biasing information that

corresponds to a field type, or communicating natural input data and the biasing information to a natural input recognition engine.

To further distinguish these differences, claim 15 has been amended to clarify that the natural input data is directed towards an input field of a program having a field type. Clearly, Kang at best teaches determining an *output* field for data that is selected by analyzing the data itself, regardless of any input field to which the text (or data corresponding thereto) may have been directed. See Kang, column 7 line 42 to column 8, line 10. Determining the meaning of text for output based on its pattern is not the same as determining the context of a field in which data may be input. Therefore, Kang does not teach all of the recitations of claim 15 and applicants submit that claim 15 is allowable over the prior art of record for at least the foregoing reasons.

Applicants respectfully submit that dependent claims 16-29, by similar analysis, are allowable. Each of these claims depends either directly or indirectly from claim 15 and consequently includes the recitations of independent claim 15. As discussed above, Kang fails to disclose the recitations of claim 15 and therefore these claims are also allowable over the prior art of record. In addition to the recitations of claim 15 noted above, each of these dependent claims includes additional patentable elements.

For example, claims 16 additionally recites wherein the field determination mechanism includes a field signature engine that generates a field signature corresponding to the field type based on characteristics of the field, and claim 19 additionally recites wherein the at least one database of biasing information

comprises a database of factoids, and wherein the input system communicates the biasing information including a factoid having at least one associated validation rule to the recognition engine. As other examples, claims 21, 22, and 24 additionally recite wherein the at least one database of biasing information comprises a database of sets of user bias data, and wherein the input system communicates the biasing information including a set of user bias data to the recognition engine (claim 21), wherein the user bias data set communicated to the recognition engine is retrieved from the database of sets of user bias data based on the field type determined by the field determination mechanism (claim 22), and a data harvesting engine that obtains at least some of the user bias data from at least one data store accessible to the computing device (claim 24). Kang is silent as to any of these concepts. For at least the foregoing reasons, applicants submit that Kang fails to teach the recitations of claims 16-29.

Turning to the last independent claim, claim 30 essentially recites a system in a computing device, comprising a field determination mechanism that determines a field type of an input field in an executable program and provides a factoid associated therewith. A human input recognizer converts natural input data to computer codes, essentially by being configured to receive the factoid, user bias data and the natural input data from the input system, and provide a recognition result based thereon.

The Office action rejected claim 30 as being anticipated by Kang. More specifically, the Office action contends that Kang teaches a field determination mechanism that determines a field type in an executable program and provides a

factoid associated therewith. Column 7, line 42 to column 8, line 67 of Kang is referenced. Further, the Office action contends that Kang teaches a database of biasing information including sets of user bias data corresponding to factoids. Column 10, line 4-30 of Kang is referenced. Further yet, the Office action contends that Kang teaches an input system configured to receive natural input data, to obtain a factoid from the field determination mechanism, and to obtain user bias data corresponding to the factoid. Fig. 4, column 8, lines 45-67, and column 10, lines 4–30 of Kang are referenced. Still further, the Office action also contends that Kang teaches a recognizer that converts natural input data to computer codes, the recognizer configured to receive the factoid, the user bias data and the natural input data from the input system and to provide a recognition result comprising a set of at least one computer code to the input system based on the natural input data, the factoid and the user bias data. Column 8, line 3 to column 9, line 20 of Kang is referenced. Finally, the Office action contends that Kang teaches the input system returning data to the executable program that corresponds to the recognition result. Fig. 2 and Fig. 3 of Kang are referenced. Applicants respectfully disagree.

As discussed above, Kang is directed to a system and method that only uses textual inputs to a program to determine an output location. Kang simply does not describe a field determination mechanism that determines a field type of an input field in an executable program and provides a factoid associated therewith. Rather, the cited sections of Kang describe receiving text directed to an input buffer in order to identify records in a database for which it may apply.

Furthermore, in contrast to applicants' recitation of a database of biasing information including sets of user bias data corresponding to factoids associated with a field type, the cited sections of Kang describe using a dictionary for identifying record fields from the tokens in a database for storing (as an output) the input text. Thus, dictionary words are used to determine which record field in the database to which input text belongs. Nowhere in Kang may there be found a database of biasing information including sets of user bias data corresponding to factoids associated with a field type of an input field in an executable program.

As such, Kang does not teach a field determination mechanism as is recited in claim 30. Nor does Kang teach biasing information including sets of user bias data corresponding to factoids as also recited in claim 30. Furthermore, Kang does not teach an input system configured to receive natural input data, to obtain a factoid from the field determination mechanism, and to obtain user bias data corresponding to the factoid, as also recited in claim 30.

Applicants respectfully submit that dependent claims 31-32, by similar analysis, are allowable. Each of these claims depends directly from claim 30 and consequently includes the recitations of independent claim 30. As discussed above, Kang fails to disclose the recitations of claim 30 and therefore these claims are also allowable over the prior art of record. In addition to the recitations of claim 30 noted above, each of these dependent claims includes additional patentable elements.

For at least these additional reasons, applicants submit that all of the claims are patentable over the prior art of record. Reconsideration and withdrawal of the

rejections in the Office action is respectfully requested and timely allowance of this application is earnestly solicited.

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CONCLUSION

In view of the foregoing remarks, it is respectfully submitted that claims 1-32 are patentable over the prior art of record, and that the application is in good and proper form for allowance. A favorable action on the part of the Examiner is earnestly solicited.

If in the opinion of the Examiner a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney at (425) 836-3030.

Respectfully submitted,

Albert S. Michalik, Reg. No. 37,395
Attorney for Applicants
Law Offices of Albert S. Michalik, PLLC
704 - 228th Avenue NE, Suite 193
Sammamish, WA 98074
(425) 836-3030
(425) 836-8957 (facsimile)

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2860 Third Amendment